

(No Model.)

G. YULE & W. D. YOCOM.
Machine for Hardening Felt.

No. 238,267.

Patented March 1, 1881.

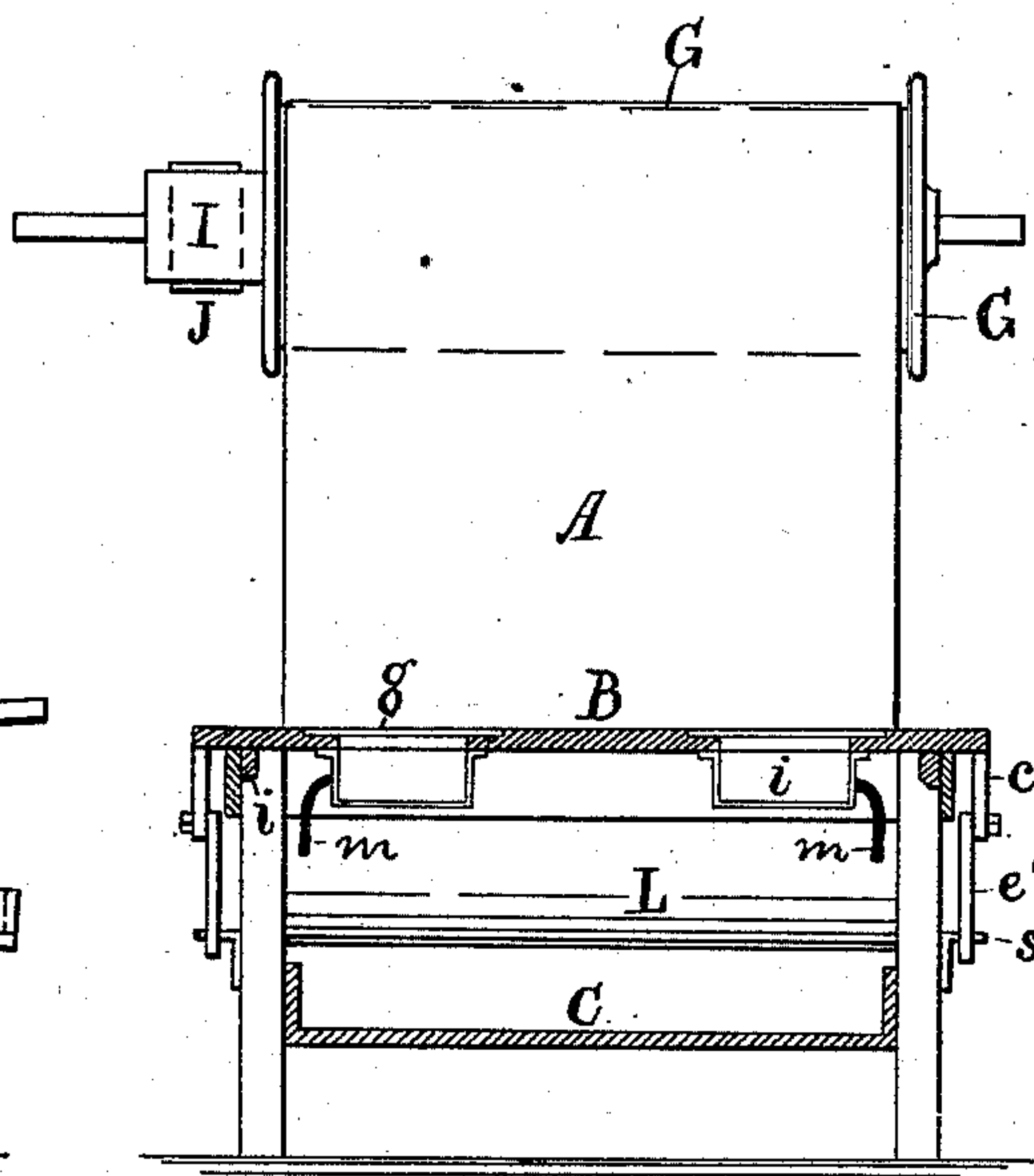
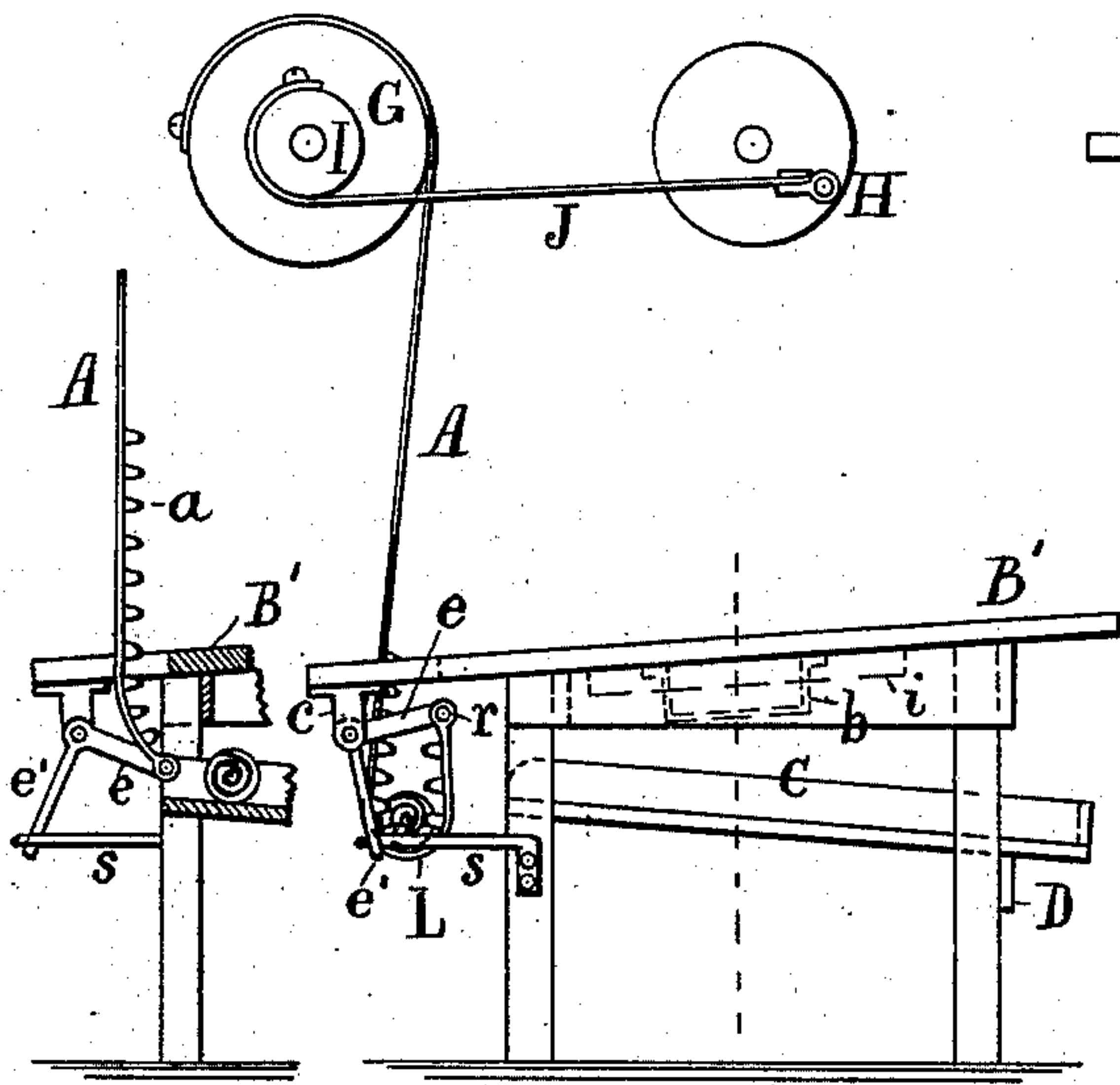
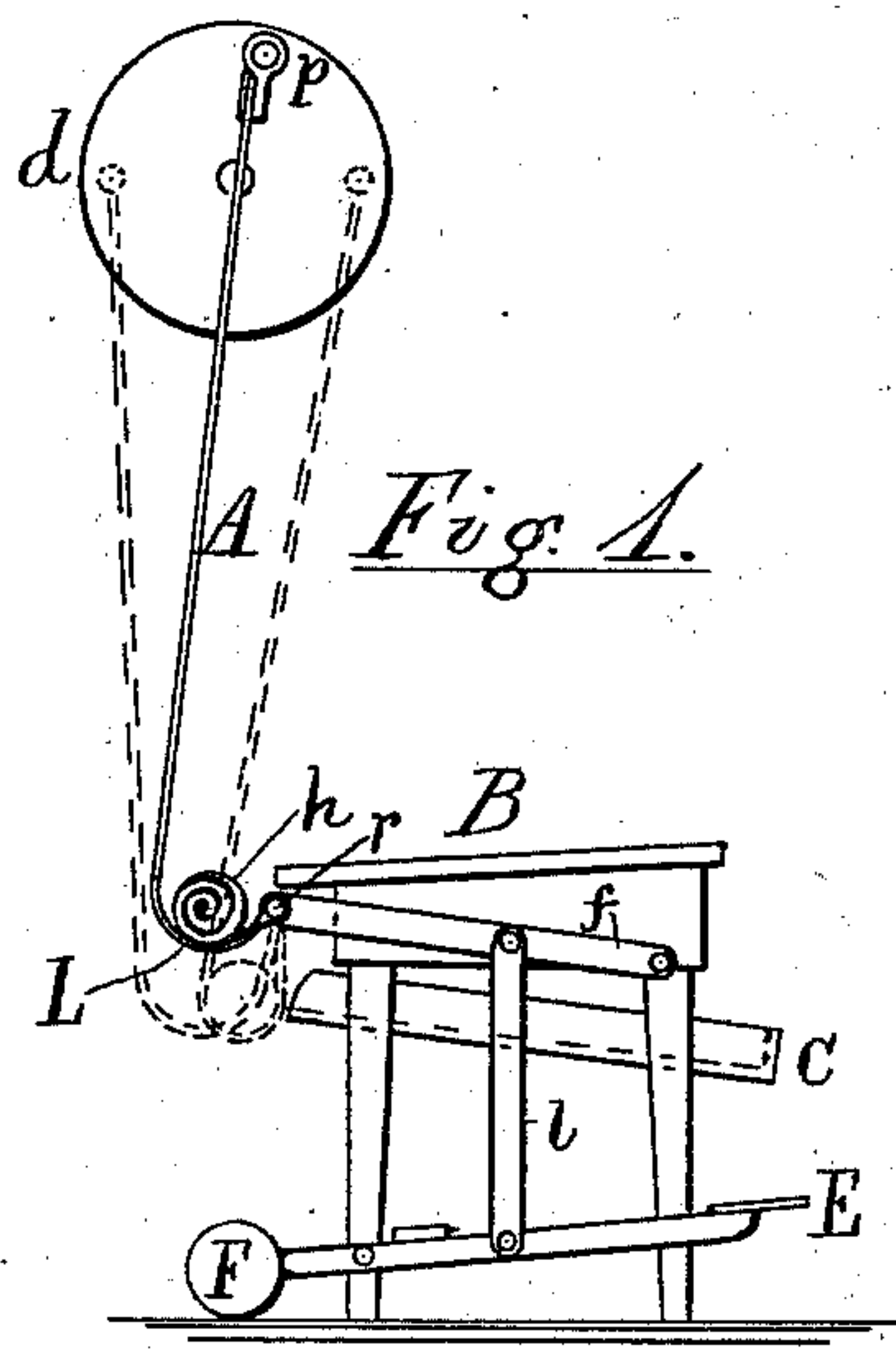
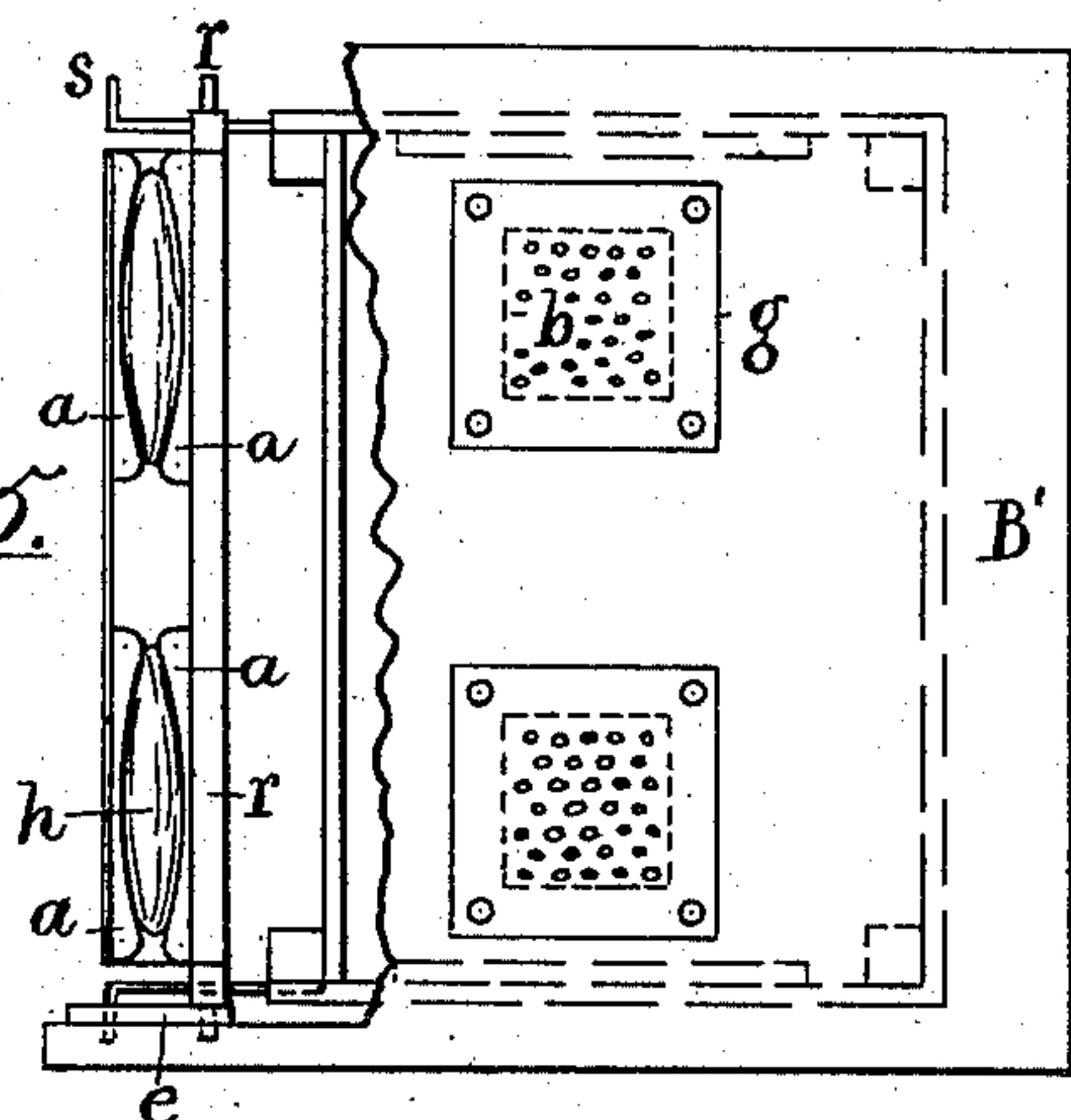
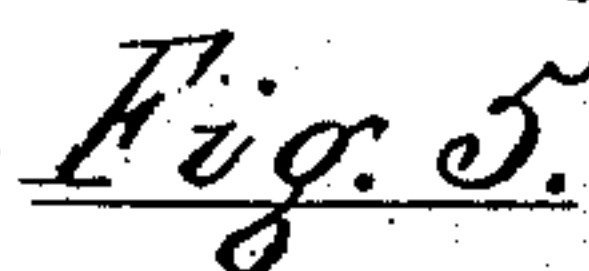
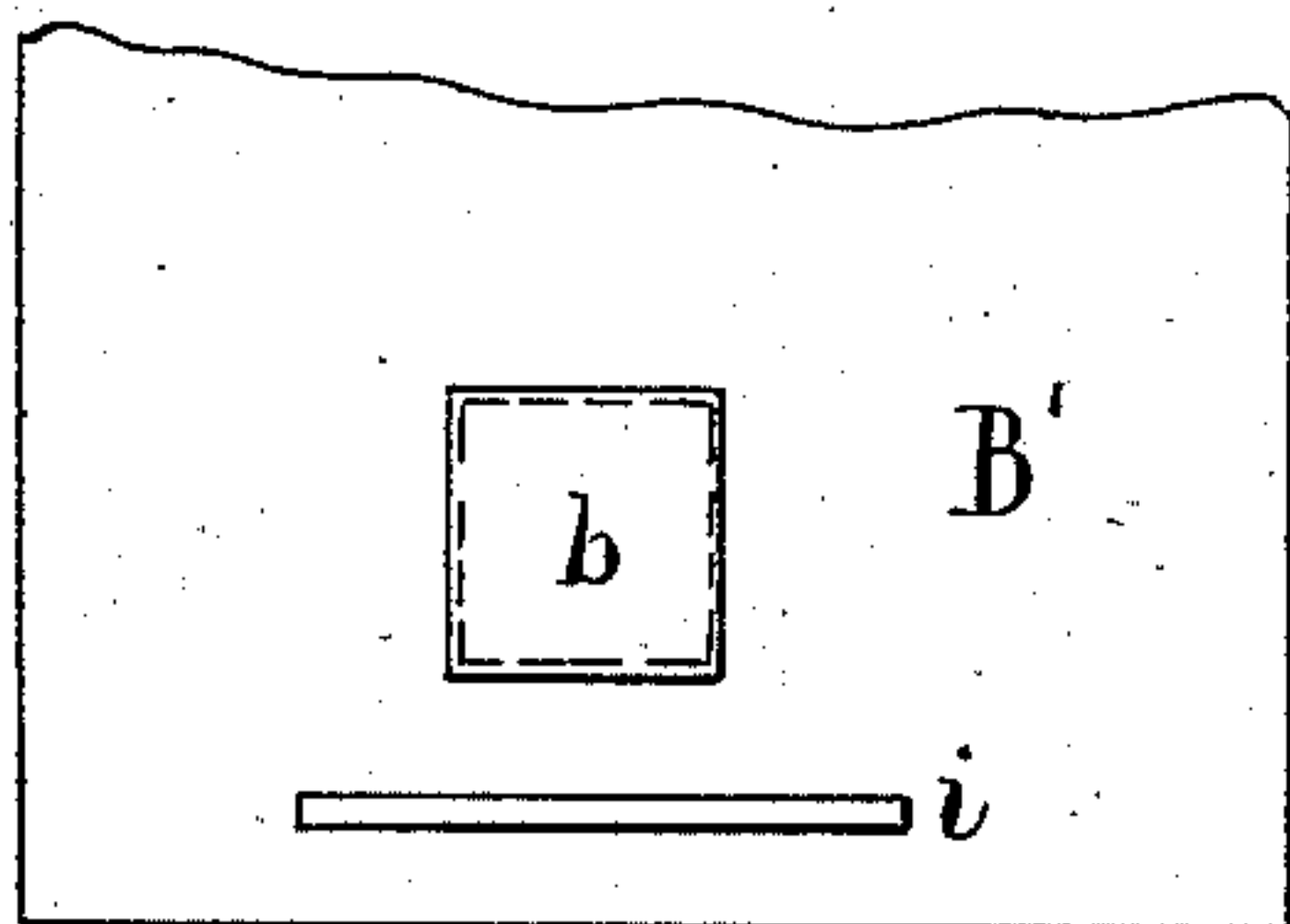


Fig. 4.

Fig. 3.

Attest:

A. W. Crane.

W. Dietz

Fig. 2.

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UNITED STATES PATENT OFFICE.

GEORGE YULE, OF NEWARK, NEW JERSEY, AND WILLIAM D. YOCOM, OF
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MACHINE FOR HARDENING FELT.

SPECIFICATION forming part of Letters Patent No. 238,267, dated March 1, 1881.

Application filed October 28, 1880. (No model.)

To all whom it may concern:

Be it known that we, GEORGE YULE, of Newark, New Jersey, and WILLIAM D. YOCOM, of Brooklyn, in the State of New York, both
5 being citizens of the United States, have invented a new and useful Improvement in Machines for Hardening Felts, of which the following is a description.

Our invention relates to an improvement in
10 apparatus for treating felts when first formed, before the fibers are matted sufficiently to endure any rough treatment.

We have found that the most effective machines for sizing felts—as, for instance, hat-
15 bodies—were those in which the felt was subjected to pressure and movement in contact with uneven or ribbed surfaces; but as such surfaces are usually formed upon metallic or wooden objects, they were not adapted to operate upon a new hat-body wherein the union
20 of the fibers was very imperfect, because of the liability of such uneven surfaces or projections to strain and rupture the tender felt. It has therefore long been customary to harden
25 the felts by a hand-rubbing preparatory to the use of any machine for performing the true sizing operation, and when rollers have been used in this preparatory stage it has been found necessary to leave them smooth, where-
30 by their operation upon the felts was limited to the gentle pressure they exerted.

The object of our invention is to secure the benefits of a rough or ribbed surface in operating upon the new unhardened felts, and we
35 effect that object by mounting the ribs or slats employed upon a yielding surface in the form of a hanging belt, a loop at the lower end of the belt sustaining the felts in its fold and applying to them a pressure graduated simply
40 by the gravity of the felts themselves. Having devised the looped belt for the purpose of affording the most yielding surface for the attachment of the pressing-ribs, we find that it is also peculiarly adapted to operate upon the
45 felts without the ribs when they need the gentlest treatment at the outset.

In the drawings annexed our hanging belt is shown fitted up with various appliances for its convenient use, Figure 1 showing a side
50 view of the belt applied to the rear edge of a

work bench or table, Fig. 2 being a front elevation of a double machine fitted for two workmen, the table being in section on line xx in Fig. 3; Fig. 3, a side elevation of the same, showing an automatic device for dumping the
55 felts by the movement of the table-top; Fig. 4, a sectional view of the rear end of the same table; and Fig. 5, a plan of the double machine, with the rear of the table-top broken away. Fig. 6 is a view of the under side of one-half
60 of the sliding table-top, showing the guiding-cleats and the steam-box.

In Fig. 1, A represents the hanging belt, the upper end being operated by any suitable mechanism, so as to reciprocate vertically, and the
65 lower end being sustained in such a position that a fold will be formed, into which the roll of felt may be laid, and wherein it will be rolled as the moving side of the belt is raised and
70 lowered. Thus arranged, the felts could be inserted in the fold and removed by hand; but for convenient use we have devised a means of inserting and removing them more automatic in its operation. In Fig. 1, for instance,
75 a table is shown situated near the lower end of the belt, and a treadle is connected with the table to discharge the felts from the fold into a chute, whereby they may be returned automatically to the workman at the front side of
80 the table.

B is the table; C, the chute, secured by bars to the legs of the table; and E, the treadle, pivoted to one of the legs, and provided with a counter-balance, F, to keep the foot-plate elevated and the lower end of the belt looped up.
85 This is accomplished by fitting that end of the belt to a cross bar or rod, r , sustained by two levers, f , which are pivoted to the side of the table, and arranged to be pulled downward by the treadle through the medium of the links
90 l , pinned to the middle of the levers and treadle-arms. The top of the table is inclined toward the rear side, so that any roll of felts laid thereon will roll into the open loop L, which is caused to assume the different forms indicated
95 in dotted lines by the reciprocating motion of the moving side of the belt. Such reciprocating motion does not need to be in a straight line, and we therefore use a revolving crank-pin, p , attached to a rotary disk, d , for moving
100

the free side of the belt up and down. A special advantage of this means of reciprocating the belt is found in the tendency of the loose side of the belt to draw against the roll of felts as the crank-pin carries the top of the belt toward the end of the table in its upward stroke. The felts are thus rolled back and forth in the fold of the belt as it is vibrated, and are pressed upon both sides by the tendency of the loop to close together, the roll being also gradually tightened by the intermittent pull of the belt toward the fixed rod *r* beneath the rear edge of the table.

The operation of the rod-supporting levers *f* when moved by the treadle *E* is to lower the fixed end of the belt, and permit the discharge of the felts when desired. This is effected by making the length of the belt but little more than the distance from the crank-pin when at the top of its stroke, and the rod *r* when depressed by the treadle. The loop *L* is thus straightened out at pleasure, and the felts caused to roll out into the higher end of the inclined chute *C*, in which they roll to the position occupied by the workman, who stands before the table to prepare them properly before they are rolled into the loop of the belt.

To adapt the machine to operate more rapidly we have devised the attachments shown in Figs. 2 to 6, wherein the belt is represented wide enough to receive two rolls of felts at once, and a steaming-box and plate are attached to the table, an automatic discharger arranged to be operated by sliding the table-top, and convex ribs secured to the belt for pressing the convex profile of the felt roll more perfectly.

In the drawings, *h* is the roll of hats to be hardened; *a*, the ribs applied to the fold of the belt *A*; *b*, the steam-box secured beneath the moving table-top *B'*; *g*, a steam-plate of perforated metal or wood provided in the top of the table over the box; *i*, cleats secured to the under side of the top *B'*, to guide it upon the table-frame *D'*; and *c*, bearings provided at the sides of the table-top, at the rear end, to operate the automatic discharger. *m m* are rubber steam-pipes, to permit the movement of the top *B'* and maintain the connections to box *b*.

The chute *C*, as in Fig. 1, is supported upon the legs of the table, with its rear end near the loop *L*, and the rod *r* is carried by bell-cranks pivoted upon the bearings *c*, their arms *e* sustaining the rod, and other vertical arms serving to engage with stationary stops *s* when the top of the table is drawn toward the operator for discharging a roll of hats from the belt. These stops are secured to the legs of the table near the chute, and the operation of the whole construction is as follows: The operator draws the top of the table toward him, thereby opening the fold of the belt to receive the roll of felts, and, after steaming his hat-bodies over the perforated plate provided in the top, rolls them into the loop, where they may be subjected to more or less pressure by moving

the top of the table to or from the hanging belt and closing up the sides of the fold *L*, as explained in Fig. 1. The forward movement of the top not only closes the loop, but makes it deeper, by the motion of the arms *e'* in contact with the stops *s*, and the operator can thus discharge the felts at pleasure, when the hardening process is completed, by rendering the loop so shallow that the hats will roll out into the chute upon the upward motion of the hanging belt. This he does by drawing the table-top completely toward him, afterward pushing it back a little to form a loop for the next felt inserted.

To reciprocate the wide belt shown in Figs. 2 to 5, we employ a roller, *G*, oscillated by a driving-crank, *H*, or any suitable mechanism, as that employed in reciprocating a mangle. The large roller *G* is shown provided in Figs. 2 and 3 with a small pulley, *I*, at one end, to which the end of a strap, *J*, is secured, and the strap reciprocated by the crank *H*, as described, for the hanging belt in Fig. 1. The hanging belt having its upper end secured to the roller *G*, and the latter being mounted in suitable bearings above it, the belt is thus moved up and down in a line with one edge of the roller, the movable table-top affording the means of varying the pressure of the belt upon the hats, as desired.

By the mechanism described above we are able to harden the fresh felts as soon as they can be handled and formed into a roll, hardening them first in a smooth belt like that in Fig. 1 when required, and preparing them fully for the second sizing operation by the belt with ribs *a* inside the loop, as shown in Fig. 3.

By the combination of the steam-box, table, and automatic discharger with the hanging belt, we secure the very best results from our invention; but these attachments not being essential to its operation, nor the addition of the ribs upon its surface, we do not limit ourselves to their use in all cases.

The mechanism for effecting the various movements may also be constructed in other ways, and the reciprocating mechanism may, if preferred, be placed upon the floor or lower parts of the machine or table frame and proper connections made to the moving end of the belt *A*.

We are aware that hats have been felted in the fold of a belt before, and do not therefore claim the same, broadly, but consider that our invention consists in supplying the belt with ribs applied to that part of the fold in which the felts are rolled; also, in reciprocating the belt by the special means claimed, and in combining the hanging belt with a table and its attachments, as herein claimed.

We therefore claim the elements of our invention in the following manner:

1. The combination of the hanging belt *A* with the fixed support at one end of the belt, the reciprocating mechanism at the other end, and the ribs *a*, applied to the fold *L*, substantially as and for the purpose set forth.

2. The combination of the hanging belt, reciprocated at one end as herein described, and provided with ribs *a* in the fold L, with the table for preparing and feeding the felts to the belt, for the purpose herein set forth.

3. The combination of the hanging belt, reciprocated at one end, with a table having an adjustable top for varying the fold of the loop, in the manner herein described.

4. The combination of the hanging belt herein described with a table-top provided with a steaming box or plate, for the purpose shown and described.

5. In combination with the feeding-table and

the hanging belt herein described, the return-
ing-chute and discharging device, operating
substantially as herein set forth.

In testimony that we claim the foregoing we
have hereunto set our hands this 18th day of
October, 1880.

GEORGE YULE.

WILLIAM D. YOCOM.

Witness as to Yule and Yocom:

THOS. S. CRANE.

Witness as to signature of Yocom:

W. DIETZ.

Witness as to Yule:

M. J. DE WITT.